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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No. 09/761,623	Applicant(s) OKADA ET AL.	
	Examiner James A Thompson	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _08 November 2004_.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-33_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _17 January 2001_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 08 November 2004 have been fully considered but they are not persuasive.

Applicant's arguments are directed to the amendments made to the independent claims, and not to the claims as previously filed. The prior art rejections of the present claims are given below.

Claim Groupings

2. The rejections based on prior art are organized in the following way:

The apparatus of claim 1 performs the method of claim 25 and the steps of the image processing program of claim 23. Claims 1, 23 and 25 are therefore discussed together.

Claims 2-11 respectively disclose the same limitations recited in claims 13-22. Claims 2-11 are therefore discussed, respectively, with claims 13-22.

Claims 24 and 26 disclose the same limitations and are therefore discussed together.

The apparatus of claim 27 performs the method of claim 32 and the steps of the image processing program of claim 30. Claims 27, 30 and 32 are therefore discussed together.

The apparatus of claim 29 performs the method of claim 33 and the steps of the image processing program of claim 31. Claims 29, 31 and 33 are therefore discussed together.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 27-28, 30 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda (US Patent 6,057,946) in view of Ball (*Sams Teach Yourself Linux in 24 Hours*, by Bill Ball and Stephen Smoogen, copyright 1998, Sams Publishing and Red Hat Press).

Regarding claims 27, 30 and 32: Ikeda discloses an image recording apparatus (figure 2 of Ikeda) comprising a first converting unit (figure 2(208) of Ikeda) for converting image data into primary data having an N-bit range (column 6, lines 57-63 of Ikeda) according to a first gradation conversion characteristic (figure 3(quadrant I) and column 7, lines 19-22 of Ikeda); and a second converting unit (figure 2(25) of Ikeda) for converting the image data into secondary data having an M-bit range (column 9, lines 19-22 of Ikeda) according to a second gradation conversion characteristic (column 9, lines 23-33 of Ikeda). M is greater than N and thus has a larger number of tone levels (column 9, lines 34-37 of Ikeda) representing the same density range (figure 7; figure 15; and column 9, lines 40-45 of Ikeda). Therefore, the second density range is lower in the degree of level compression than the first gradation conversion characteristic.

Ikeda further discloses a correlation calculating unit (figure 2(214(portion)) of Ikeda) for calculating data that determines correlation between the primary data and the secondary data (figure 14("10 bit") and column 9, lines 18-22 of Ikeda) and employing the calculated data as tertiary data (column 7, lines 6-9 of Ikeda). The CPU (figure 2(214) of Ikeda) sets the data in the LUT (column 7, lines 6-9 of Ikeda) which is used to correlate the primary data and the secondary data (column 9, lines 19-22 of Ikeda). The tertiary data corresponds to the values stored in the 10-bit data column of said LUT which correlate the 8-bit data to a corresponding 10-bit data along a particular curve (column 9, lines 23-33 of Ikeda). The correlation calculating unit corresponds to the portion of the CPU (figure 2(214) of Ikeda), along with the associated portions of RAM (figure 2(215) of Ikeda) used for workspace and ROM (figure 2(216) of Ikeda) used for storing the associated programs (column 5, lines 56-58 of Ikeda), that calculates the correlation between said primary data and said secondary data.

Ikeda further discloses a recording unit (figure 2(214 (portion)) of Ikeda) for recording the primary data in said LUT (figure 14 and column 9, lines 18-22 of Ikeda). A portion of the CPU (figure 2(214) of Ikeda) along with a corresponding portion of RAM (figure 2(215) of Ikeda) and ROM (figure 2(214) of Ikeda) controls the overall apparatus (column 5, lines 56-58 of Ikeda), which stores the 8-bit representation (figure 14 of Ikeda) as part of the N-bit to M-bit conversion (column 9, lines 18-22 of Ikeda). Said recording unit (figure 2(214(portion)) of Ikeda) records the primary data and the tertiary data in said LUT (figure 14 and column 9, lines 18-22 of Ikeda). Said

recording unit corresponds to the portion of said CPU, along with corresponding portions of said RAM and said ROM, that performs the actual writing of the primary data and tertiary data to said LUT.

Ikeda further discloses a reading unit (figure 2(214 (portion)) of Ikeda) for reading the primary data and the tertiary data from the LUT (column 9, lines 18-22 of Ikeda). In order for said image recording apparatus to convert the 8-bit data to 10-bit data using the primary data and the tertiary data stored in said LUT, said primary data and said tertiary data must be read. The reading unit corresponds to the portion of said CPU, along with corresponding portions of said RAM and said ROM, that performs the actual reading of the primary data and tertiary data from said LUT.

Ikeda further discloses a secondary data calculating unit (figure 2(214(portion)) of Ikeda) for reproducing the secondary data based on the primary data and the tertiary data (column 9, lines 34-38 of Ikeda). The secondary data calculating unit corresponds to the portion of said CPU, along with corresponding portions of said RAM and said ROM, that performs the transform using said primary data and said tertiary data stored in said LUT (column 9, lines 18-22 of Ikeda) to convert the primary (8-bit) data to the secondary (10-bit) data (column 9, lines 34-38 of Ikeda).

Ikeda does not disclose expressly that that said primary data and said tertiary data are written in a file; and that said reading unit reads the primary data and the tertiary data from a file.

Ball discloses storing digital data in a computer file (page 78, lines 5-7 of Ball); and reading digital data from a computer file (page 58, lines 18-24 of Ball).

Ikeda and Ball are combinable because they are from similar problem solving areas, namely the storage and manipulation of computer data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to store said primary and tertiary data, as taught by Ikeda, in a file, as taught by Ball. Further, at the time of the invention, it would have been obvious to a person of ordinary skill in the art to read said primary and tertiary data, as taught by Ikeda, from a file, as taught by Ball. The motivation for doing so would have been to be able to archive the data and thus retrieve and/or transport said data later (page 78, lines 1-5 of Ball). Therefore, it would have been obvious to combine Ball with Ikeda to obtain the invention as specified in claims 27, 30 and 32.

Regarding claim 28: Ikeda discloses that the secondary data calculating unit level-compresses the secondary data (figure 20 and column 10, lines 27-31 of Ikeda) so that the data has a bit range gradation-reproducible by an external apparatus, and outputs the level compressed data (figure 19 and column 10, lines 24-27 of Ikeda). For highlight regions, there is a high tonality representation (figure 20 and column 10, lines 27-31 of Ikeda). Therefore, the secondary (10-bit output) data is level-compressed for the highlight region (column 10, line 32 of Ikeda). Said level-compression is performed so that a laser output device can properly reproduce the image data (column 10, lines 24-27 and lines 33-35 of Ikeda).

5. Claims 1-5, 11-16 and 22-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda (US Patent 6,057,946) in view of Gann (US Patent 6,542,260 B1) and Ball (*Sams Teach Yourself Linux in 24 Hours*, by Bill Ball and Stephen Smoogen, copyright 1998, Sams Publishing and Red Hat Press).

Regarding claims 1, 23 and 25: Ikeda discloses an image recording apparatus (figure 2 of Ikeda) comprising a first converting unit (figure 2(208) of Ikeda) for converting image data into primary data having an N-bit range (column 6, lines 57-63 of Ikeda) according to a first gradation conversion characteristic (figure 3(quadrant I) and column 7, lines 19-22 of Ikeda); and a second converting unit (figure 2(25) of Ikeda) for converting the image data into secondary data having an M-bit range (column 9, lines 19-22 of Ikeda) according to a second gradation conversion characteristic (column 9, lines 23-33 of Ikeda). M is greater than N and thus has a larger number of tone levels (column 9, lines 34-37 of Ikeda) representing the same density range (figure 7; figure 15; and column 9, lines 40-45 of Ikeda). Therefore, the second density range is lower in the degree of level compression than the first gradation conversion characteristic.

Ikeda further discloses a correlation calculating unit (figure 2(214(portion)) of Ikeda) for calculating data that determines correlation between the primary data and the secondary data (figure 14("10 bit") and column 9, lines 18-22 of Ikeda) and employing the calculated data as tertiary data (column 7, lines 6-9 of Ikeda). The CPU (figure 2(214) of Ikeda) sets the data in the LUT (column 7, lines 6-9 of Ikeda) which is used to correlate the primary data and the secondary data (column 9, lines 19-22 of Ikeda). The tertiary data

corresponds to the values stored in the 10-bit data column of said LUT which correlate the 8-bit data to a corresponding 10-bit data along a particular curve (column 9, lines 23-33 of Ikeda). The correlation calculating unit corresponds to the portion of the CPU (figure 2(214) of Ikeda), along with the associated portions of RAM (figure 2(215) of Ikeda) used for workspace and ROM (figure 2(216) of Ikeda) used for storing the associated programs (column 5, lines 56-58 of Ikeda), that calculates the correlation between said primary data and said secondary data.

Ikeda further discloses a recording unit (figure 2(214 (portion)) of Ikeda) for recording the primary data in said LUT (figure 14 and column 9, lines 18-22 of Ikeda). A portion of the CPU (figure 2(214) of Ikeda) along with a corresponding portion of RAM (figure 2(215) of Ikeda) and ROM (figure 2(214) of Ikeda) controls the overall apparatus (column 5, lines 56-58 of Ikeda), which stores the 8-bit representation (figure 14 of Ikeda) as part of the N-bit to M-bit conversion (column 9, lines 18-22 of Ikeda). Said recording unit records the primary data and the tertiary data in said LUT (figure 14 and column 9, lines 18-22 of Ikeda). Said recording unit corresponds to the portion of said CPU, along with corresponding portions of said RAM and said ROM, that performs the actual writing of the primary data and tertiary data to said LUT.

Ikeda does not disclose expressly that the calculated data includes level information in the secondary data which was lost in the primary data; and that said primary data and said tertiary data are written in a file.

Gann discloses recording primary data and secondary data (column 4, lines 14-16; column 5, lines 4-10 and column 11,

lines 28-29 and column 12, lines 1-2 of Gann), wherein said primary data and said secondary data are correlated since said primary data and said secondary data are both representations of the same image, but with different numbers of bits (column 5, lines 4-10 of Gann). The secondary data therefore includes level information which was lost in the primary data.

Ikeda and Gann are combinable because they are from the same field of endeavor, namely image data processing, storage and manipulation. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to set the gradation levels of the secondary data taught by Ikeda using a separate scan, as taught by Gann, and thus including in the correlation data the level information in the second data which was lost in the primary data. The motivation for doing so would have been to obtain a high quality image while reducing the memory requirements (column 4, line 64 to column 5, line 7 of Gann). Therefore, it would have been obvious to combine Gann with Ikeda.

Ikeda in view of Gann does not disclose expressly that said primary data and said secondary data are written in a file.

Ball discloses storing digital data in a computer file (page 78, lines 5-7 of Ball).

Ikeda in view of Gann is combinable with Ball because they are from similar problem solving areas, namely the storage and manipulation of computer data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to store said primary and tertiary data, as taught by Ikeda, in a file, as taught by Ball. The motivation for doing so would have been to be able to archive the data and thus retrieve and/or transport said data later (page 78, lines 1-5 of Ball).

Therefore, it would have been obvious to combine Ball with Ikeda in view of Gann to obtain the invention as specified in claims 1, 23 and 25.

Regarding claim 12: The arguments regarding claims 1, 23 and 25 are incorporated herein.

Ikeda discloses that the primary data is 8-bit data (column 6, lines 57-63 of Ikeda). Said primary data can therefore represent the density curve (figure 6 of Ikeda) at a maximum number of 256 levels (column 7, lines 29-30 of Ikeda). 256 possible representations is therefore the limit of the amount of information available about said density curve. Said primary data is therefore irreversibly compressed since it is not possible to obtain more information about the density curve from 8 bits of data. Any higher bit representations based on said 8-bit data would necessarily be interpolations or other types of approximations. Therefore, said recording unit is a unit for irreversibly compressing the primary data and recording the irreversibly compressed primary data.

Ikeda further discloses that said correlation calculating unit is a unit for expanding the irreversibly compressed primary data (column 9, lines 19-22 of Ikeda), calculating data that determines correlation between the expanded primary data and the secondary data (column 9, lines 9-13 and lines 28-33 of Ikeda), and employing the calculated data as the tertiary data (column 9, lines 34-37 of Ikeda). The relationship used to determine the correlation between the primary data and secondary data is calculated (column 9, lines 28-33 of Ikeda) and used to convert between said primary data (8-bit) and said secondary data (10-bit) (column 9, lines 34-37 of Ikeda) and stored in the LUT (figure 14 and column 9, lines 19-22 of Ikeda).

Regarding claims 2 and 13: Ikeda discloses that the recording unit records the primary data in an image storage segment (figure 14("8-bit") of Ikeda) to be preferentially referred to, which is in the LUT (column 9, lines 18-22 of Ikeda). Every element of the primary (8-bit) data is recorded in a segment of the LUT (figure 14("8-bit") of Ikeda) and referenced for the conversion between 8-bit image data and 10-bit image data (column 9, lines 18-22 of Ikeda), thus causing said 8-bit image data to be the data that is preferentially referred to.

Ikeda does not disclose expressly that the primary data is in the file.

Ball discloses storing digital data in a computer file (page 78, lines 5-7 of Ball).

Ikeda and Ball are combinable because they are from similar problem solving areas, namely the storage and manipulation of computer data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to store said primary data in a computer file. The motivation for doing so would have been to be able to archive the data and thus retrieve and/or transport said data later (page 78, lines 1-5 of Ball). Therefore, it would have been obvious to combine Ball with Ikeda to obtain the invention as specified in claims 2 and 13.

Regarding claims 3 and 14: Ikeda discloses that the recording unit records the tertiary data (figure 14("10-bit") of Ikeda) in an application segment optionally able to be added, which is in the LUT (column 7, lines 22-24 and lines 29-30; and column 9, lines 18-22 of Ikeda). The conversion data for the laser output is stored in the LUT, which may be 8-bit conversion data (column 7, lines 22-24 and lines 29-30 of Ikeda), or may

optionally be said tertiary (10-bit) data (column 9, lines 18-22 of Ikeda).

Ikeda does not disclose expressly that the tertiary data is in the file.

Ball discloses storing digital data in a computer file (page 78, lines 5-7 of Ball).

Ikeda and Ball are combinable because they are from similar problem solving areas, namely the storage and manipulation of computer data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to store said tertiary data in a computer file. The motivation for doing so would have been to be able to archive the data and thus retrieve and/or transport said data later (page 78, lines 1-5 of Ball). Therefore, it would have been obvious to combine Ball with Ikeda to obtain the invention as specified in claims 3 and 14.

Regarding claims 4 and 15: Ikeda discloses that the first gradation conversion characteristic and the second gradation conversion characteristic have the same characteristic curve in at least a part of an entire input signal range (figure 15 and column 9, lines 34-37 of Ikeda). As can be clearly seen in figure 15 of Ikeda, the first (8-bit) gradation conversion characteristic and the second (10-bit) gradation conversion characteristic have the same characteristic curve for the signal range shown. They simply have a different number of levels that can be displayed within said signal range (column 9, lines 34-37 of Ikeda).

Regarding claims 5 and 16: Ikeda discloses that the correlation calculating unit calculates data relating to dissimilarity between the primary data and the secondary data (column 9, lines 22-33 of Ikeda) and employs the calculated data

as the tertiary data (column 7, lines 6-9 of Ikeda). Ikeda teaches using an equation (column 9, lines 27-33 of Ikeda) to calculate the conversion, and thus the dissimilarity, between the 8-bit image data and the 10-bit image data (column 9, lines 22-26 of Ikeda), and then stores the relevant tertiary (10-bit) data points in the LUT (figure 14("10-bit") of Ikeda) as conversion data (column 7, lines 6-9 of Ikeda).

Regarding claims 11 and 22: Ikeda discloses that the second converting unit changes the second gradation conversion characteristic in accordance with a feature of the image data (figure 20 and column 10, lines 27-35 of Ikeda). The tonality conversion is modified based on whether the region of image data is a highlight portion or an image portion (figure 20 and column 10, lines 27-35 of Ikeda).

Regarding claims 24 and 26: Ikeda discloses that the primary data is 8-bit data (column 6, lines 57-63 of Ikeda). Said primary data can therefore represent the density curve (figure 6 of Ikeda) at a maximum number of 256 levels (column 7, lines 29-30 of Ikeda). 256 possible representations is therefore the limit of the amount of information available about said density curve. Said primary data is therefore irreversibly compressed since it is not possible to obtain more information about the density curve from 8 bits of data. Any higher bit representations based on said 8-bit data would necessarily be interpolations or other types of approximations. Therefore, said recording unit is a unit for irreversibly compressing the primary data and recording the irreversibly compressed primary data.

Ikeda further discloses that said correlation calculating unit is a unit for expanding the irreversibly compressed primary

data (column 9, lines 19-22 of Ikeda), calculating data that determines correlation between the expanded primary data and the secondary data (column 9, lines 9-13 and lines 28-33 of Ikeda), and employing the calculated data as the tertiary data (column 9, lines 34-37 of Ikeda). The relationship used to determine the correlation between the primary data and secondary data is calculated (column 9, lines 28-33 of Ikeda) and used to convert between said primary data (8-bit) and said secondary data (10-bit) (column 9, lines 34-37 of Ikeda) and stored in the LUT (figure 14 and column 9, lines 19-22 of Ikeda).

6. Claims 6-7, 10, 17-18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda (US Patent 6,057,946) in view of Gann (US Patent 6,542,260 B1), Ball (*Sams Teach Yourself Linux in 24 Hours*, by Bill Ball and Stephen Smoogen, copyright 1998, Sams Publishing and Red Hat Press), and Imai (US Patent 6,038,369).

Regarding claims 6 and 17: Ikeda in view of Gann and Ball does not disclose expressly that the recording unit compresses the tertiary data by nonlinearly quantizing it and records the compressed tertiary data in the file.

Imai discloses compressing digital image data by nonlinear quantization of said digital data (column 9, lines 61-62 of Imai).

Ikeda in view of Gann and Ball is combinable with Imai because they are from similar problem solving areas, namely the storage and manipulation of digital computer data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use nonlinear quantization to compress digital image data, as taught by Imai, said digital

image data being the tertiary data taught by Ikeda, and storing said compressed digital image data in a file, as taught by Ball. The motivation for doing so would have been to store only perceptually critical information (column 9, lines 56-58 of Imai). Therefore, it would have been obvious to combine Imai with Ikeda in view of Gann and Ball to obtain the invention as specified in claims 6 and 17.

Regarding claims 7 and 18: Ikeda in view of Gann and Ball does not disclose expressly that the recording unit compresses the tertiary data by increasing a sampling increment of the tertiary data on an image space and records the compressed tertiary data in the file.

Imai discloses compressing digital image data using Huffman coding (column 9, lines 41-47 of Imai), which increases a sampling increment of an image space since Huffman coding minimizes redundancy by recording only perceptually critical information (column 9, lines 41-42 and lines 56-58 of Imai).

Ikeda in view of Gann and Ball is combinable with Imai because they are from similar problem solving areas, namely the storage and manipulation of digital computer data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use compress digital image data by using Huffman coding, as taught by Imai, said digital image data being the tertiary data taught by Ikeda, and storing said compressed digital image data in a file, as taught by Ball. The motivation for doing so would have been to store only perceptually critical information (column 9, lines 56-58 of Imai). Therefore, it would have been obvious to combine Imai with Ikeda in view of Gann and Ball to obtain the invention as specified in claims 7 and 18.

Regarding claims 10 and 21: Ikeda in view of Gann and Ball does not disclose expressly that the recording unit compresses the tertiary data by run-length coding, entropy coding, and/or predictive coding, and records the compressed tertiary data in the file.

Imai discloses compressing digital image data using entropy coding (column 9, lines 41-44 of Imai).

Ikeda in view of Gann and Ball is combinable with Imai because they are from similar problem solving areas, namely the storage and manipulation of digital computer data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use compress digital image data by using entropy coding, as taught by Imai, said digital image data being the tertiary data taught by Ikeda, and storing said compressed digital image data in a file, as taught by Ball. The motivation for doing so would have been to store only perceptually critical information (column 9, lines 56-58 of Imai). Therefore, it would have been obvious to combine Imai with Ikeda in view of Gann and Ball to obtain the invention as specified in claims 10 and 21.

7. Claims 8-9 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda (US Patent 6,057,946) in view of Gann (US Patent 6,542,260 B1), Ball (*Sams Teach Yourself Linux in 24 Hours*, by Bill Ball and Stephen Smoogen, copyright 1998, Sams Publishing and Red Hat Press), and Hayashi (US Patent 5,754,683).

Regarding claims 8 and 19: Ikeda in view of Gann and Ball does not disclose expressly that the recording unit discriminates non-correlation regions that are image areas where

a substantial dissimilarity exists between the primary data and the secondary data, and records the tertiary data in the file in a manner that the tertiary data is divided into map data indicating shapes of the non-correlation regions and data indicating values of the non-correlation regions.

Hayashi discloses discrimination non-correlation regions (figure 7(R1-R3) of Hayashi) that are image areas where a substantial dissimilarity (figure 7(ΔX0…ΔX8) of Hayashi) exists between primary image data (figure 7(Pj) of Hayashi) and secondary image data (figure 7(PG) and column 14, lines 31-38 of Hayashi), and records the tertiary (difference) data in a manner that said tertiary data is divided into map data indicating shapes of the non-correlation regions (figure 6b of Hayashi) and data indicating value of the non-correlation regions (column 14, lines 43-48 of Hayashi). The gradation curve is divided into three regions (figure 7(R1-R3) and column 14, lines 49-51 of Hayashi) and the dissimilarity between a pre-stored gradation curve (figure 7(PG) of Hayashi) and a measured gradation curve (figure 7(Pj) of Hayashi) is measured at several points (column 14, lines 31-38 of Hayashi). The closest shape out of a group of stored shapes (figure 6b of Hayashi) is determined and used, thus mapping and indicating the shapes of the non-correlation regions (column 14, lines 43-48 of Hayashi).

Ikeda in view of Gann and Ball is combinable with Hayashi because they are from the same field of endeavor, namely digital data processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to determine a gradation curve shape that minimizes error and best matches the measured shape of the gradation curve, as taught by Hayashi, said curves being the primary (8-bit) gradation curve

and secondary (10-bit) gradation curve taught by Ikeda. The motivation for doing so would have been to decrease processing time by having a pre-determined set of possible gradation curve shapes (column 2, lines 33-38 of Hayashi). Therefore, it would have been obvious to combine Hayashi with Ikeda in view of Gann and Ball to obtain the invention as specified in claims 8 and 19.

Regarding claims 9 and 20: Ikeda in view of Gann and Ball does not disclose expressly that the recording unit discriminates a non-coincidence position that is a position in an image where the secondary data cannot be calculated directly from the primary data, and records the tertiary data at the non-coincidence position in the file.

Hayashi discloses discriminating a non-coincidence position that is a position in a gradation curve (figure 7(G5) of Hayashi), and therefore a corresponding pixel value which would be represented at corresponding positions in an image, where the secondary data (figure 7(PG) of Hayashi) cannot be calculated directly from the primary data (figure 7(Pj) of Hayashi) (column 14, lines 31-38 of Hayashi). The data of the pre-stored gradation curve (figure 7(PG) of Hayashi) cannot be calculated directly from the measured gradation curve (figure 7(Pj) of Hayashi), so the differences between them have to be directly calculated (column 14, lines 31-38 of Hayashi). The tertiary data ($\Delta X0 \ldots \Delta X8$) is recorded at the non-coincidence positions since said tertiary data must be used for calculations at the non-coincidence positions (column 14, lines 43-46 of Hayashi).

Ikeda in view of Gann and Ball is combinable with Hayashi because they are from the same field of endeavor, namely digital data processing. At the time of the invention, it would have

been obvious to a person of ordinary skill in the art to calculate and record the correction data of the gradation curve, as taught by Hayashi, said correction data being the tertiary data taught by Ikeda, into the file, as taught by Ball. The motivation for doing so would have been to decrease processing time by having a pre-determined set of possible gradation curve shapes (column 2, lines 33-38 of Hayashi). Therefore, it would have been obvious to combine Hayashi with Ikeda in view of Gann and Ball to obtain the invention as specified in claims 9 and 20.

8. Claims 29, 31 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda (US Patent 6,057,946) in view of Ball (*Sams Teach Yourself Linux in 24 Hours*, by Bill Ball and Stephen Smoogen, copyright 1998, Sams Publishing and Red Hat Press) and Hayashi (US Patent 5,754,683).

Regarding claims 29, 31 and 33: Ikeda discloses an image recording apparatus (figure 2 of Ikeda) comprising a first converting unit (figure 2(208) of Ikeda) for converting image data into primary data having an N-bit range (column 6, lines 57-63 of Ikeda) according to a first gradation conversion characteristic (figure 3(quadrant I) and column 7, lines 19-22 of Ikeda); and a second converting unit (figure 2(25) of Ikeda) for converting the image data into secondary data having an M-bit range (column 9, lines 19-22 of Ikeda) according to a second gradation conversion characteristic (column 9, lines 23-33 of Ikeda). M is greater than N and thus has a larger number of tone levels (column 9, lines 34-37 of Ikeda) representing the same density range (figure 7; figure 15; and column 9, lines 40-45 of Ikeda). Therefore, the second density range is lower in

the degree of level compression than the first gradation conversion characteristic.

Ikeda further discloses a correlation calculating unit (figure 2 (214(portion)) of Ikeda) for calculating data that determines correlation between the primary data and the secondary data (figure 14("10 bit") and column 9, lines 18-22 of Ikeda) and employing the calculated data as tertiary data (column 7, lines 6-9 of Ikeda). The CPU (figure 2(214) of Ikeda) sets the data in the LUT (column 7, lines 6-9 of Ikeda) which is used to correlate the primary data and the secondary data (column 9, lines 19-22 of Ikeda). The tertiary data corresponds to the values stored in the 10-bit data column of said LUT which correlate the 8-bit data to a corresponding 10-bit data along a particular curve (column 9, lines 23-33 of Ikeda). The correlation calculating unit corresponds to the portion of the CPU (figure 2(214) of Ikeda), along with the associated portions of RAM (figure 2(215) of Ikeda) used for workspace and ROM (figure 2(216) of Ikeda) used for storing the associated programs (column 5, lines 56-58 of Ikeda), that calculates the correlation between said primary data and said secondary data.

Ikeda further discloses a recording unit (figure 2(214 (portion)) of Ikeda) for recording the primary data in said LUT (figure 14 and column 9, lines 18-22 of Ikeda). A portion of the CPU (figure 2(214) of Ikeda) along with a corresponding portion of RAM (figure 2(215) of Ikeda) and ROM (figure 2(214) of Ikeda) controls the overall apparatus (column 5, lines 56-58 of Ikeda), which stores the 8-bit representation (figure 14 of Ikeda) as part of the N-bit to M-bit conversion (column 9, lines 18-22 of Ikeda).

Ikeda further discloses a reading unit (figure 2(214 (portion)) of Ikeda) for reading the primary data and the tertiary data from the LUT (column 9, lines 18-22 of Ikeda). In order for said image recording apparatus to convert the 8-bit data to 10-bit data using the primary data and the tertiary data stored in said LUT, said primary data and said tertiary data must be read. The reading unit corresponds to the portion of said CPU, along with corresponding portions of said RAM and said ROM, that performs the actual reading of the primary data and tertiary data from said LUT.

Ikeda further discloses a secondary data calculating unit (figure 2(214(portion)) of Ikeda) for reproducing the secondary data based on the primary data and the tertiary data (column 9, lines 34-38 of Ikeda). The secondary data calculating unit corresponds to the portion of said CPU, along with corresponding portions of said RAM and said ROM, that performs the transform using said primary data and said tertiary data stored in said LUT (column 9, lines 18-22 of Ikeda) to convert the primary (8-bit) data to the secondary (10-bit) data (column 9, lines 34-38 of Ikeda).

Ikeda further discloses that said secondary data calculating unit discriminates the non-coincidence positions according to pixel values of the primary data (figure 15("point not obtained in 8-bit output") and column 9, lines 38-43 of Ikeda). The non-coincidence positions of Ikeda are the levels of the 10-bit data which are not representable by the 8-bit data (column 9, lines 38-43 of Ikeda). Said secondary data calculating unit then disposes the tertiary data at the non-coincidence positions and performs positioning between the primary data and the tertiary data (column 9, lines 18-33 of

Ikeda). The 10-bit output image signal (column 9, lines 34-37 of Ikeda) is derived from the primary data (figure 14("8-bit") of Ikeda) and secondary data (figure 14("10-bit") of Ikeda) (column 9, lines 18-26 of Ikeda) using a specific equation (column 9, lines 27-33 of Ikeda). Said secondary data calculating unit then reproduces the secondary data based on the primary data and the tertiary data that corresponds to the primary data in pixel position (column 9, lines 34-37 and lines 52-55 of Ikeda).

Ikeda does not disclose expressly that said primary data and said tertiary data is written in a file; that said reading unit reads the primary data and the tertiary data from a file; and that said recording unit discriminates a non-coincidence position that is a position in an image where the secondary data cannot be calculated directly from the primary data, and records the tertiary data at the non-coincidence position in the file.

Ball discloses storing digital data in a computer file (page 78, lines 5-7 of Ball) and reading digital data from a computer file (page 58, lines 18-24 of Ball).

Ikeda and Ball are combinable because they are from similar problem solving areas, namely the storage and manipulation of computer data. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use a digital computer file, as taught by Ball, to store and read said primary and tertiary data, as taught by Ikeda. The motivation for doing so would have been to be able to archive the data and thus retrieve and/or transport said data later (page 78, lines 1-5 of Ball). Therefore, it would have been obvious to combine Ball with Ikeda.

Ikeda in view of Ball does not disclose expressly that said recording unit discriminates a non-coincidence position that is a position in an image where the secondary data cannot be calculated directly from the primary data, and records the tertiary data at the non-coincidence position in the file.

Hayashi discloses discriminating a non-coincidence position that is a position in a gradation curve (figure 7(G5) of Hayashi), and therefore a corresponding pixel value which would be represented at corresponding positions in an image, where the secondary data (figure 7(PG) of Hayashi) cannot be calculated directly from the primary data (figure 7(Pj) of Hayashi) (column 14, lines 31-38 of Hayashi). The data of the pre-stored gradation curve (figure 7(PG) of Hayashi) cannot be calculated directly from the measured gradation curve (figure 7(Pj) of Hayashi), so the differences between them have to be directly calculated (column 14, lines 31-38 of Hayashi). The tertiary data ($\Delta X0 \ldots \Delta X8$) is recorded at the non-coincidence positions since said tertiary data must be used for calculations at the non-coincidence positions (column 14, lines 43-46 of Hayashi).

Ikeda in view of Ball is combinable with Hayashi because they are from the same field of endeavor, namely digital data processing. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to calculate and record the correction data of the gradation curve, as taught by Hayashi, said correction data being the tertiary data taught by Ikeda, into the file, as taught by Ball. The motivation for doing so would have been to decrease processing time by having a pre-determined set of possible gradation curve shapes (column 2, lines 33-38 of Hayashi). Therefore, it would have been obvious

to combine Hayashi with Ikeda in view of Ball to obtain the invention as specified in claims 29, 31 and 33.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A Thompson whose telephone number is 703-305-6329. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K Moore can be reached on 703-308-7452. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James A. Thompson
Examiner
Art Unit 2624

JAT
18 March 2005

THOMAS D.
LEE
PRIMARY EXAMINER